REMARKS

Claims 3-4, 6, 19-29, 42-43 and 45-48 are currently pending in this application. Claim 28 has been amended. Claims 1, 2, 5, 7-18, 30-41 and 44 have been withdrawn from consideration as being directed to a non-elected invention. No new matter has been added by this amendment. Applicants reserve the right to pursue the original claims and other claims in this and other applications. Applicants respectfully request reconsideration in light of the above amendments and the following remarks.

Applicants confirm the election to prosecute Invention II, Species 1, claims 3, 4, 6, 19-29, 42, 43 and 45-48, as made during a telephone conversation between Jennifer McCue (Reg. No. 55,440) and the Examiner on December 18, 2007. Accordingly, claims 1, 2, 5, 7-18, 30-41 and 44 have been withdrawn from consideration.

Applicants note that upon allowance of claims 3 and 42, at least claims 5 and 7; and 44 which depend from claims 3 and 42, respectively, and any other claims which require all of the limitations of any allowed claim, should be rejoined and fully examined for patentability in accordance with 37 C.F.R. § 1.104. MPEP 821.04(a).

Claim 28 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. This rejection is respectfully traversed and reconsideration is respectfully requested.

The Examiner states that claim 28 "requires 'pixels' to share a reset transistor, a source follower transistor, and a row select transistor." (Office Action, page 5). Claim 28, as amended, recites the pixel circuit of claim 27 wherein "a plurality of said photosensors, shutter transistors, storage capacitors and transfer gates share said floating diffusion node, reset transistor, source follower transistor, and row select transistor." Applicants respectfully submit that claim 28 is now in compliance with 35 U.S.C § 112. Accordingly, Applicants respectfully request that the rejection of claim 28 be withdrawn and the claim allowed.

Claims 3, 6, 19, 20, 23-29, 42, 43, 45, 46 and 48 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,731,335 ("Kim") in view of U.S. Patent No. 6,522,357 ("Beiley"). This rejection is respectfully traversed and reconsideration is respectfully requested.

The Office Action characterizes claims 3 and 6 as "method claims corresponding to apparatus claims 19 and 20" and accordingly rejects claims 3 and 6 on the same basis as claims 19 and 20. (Office Action, page 5). Claim 19 is drawn to a pixel circuit for use in an imaging device comprising "a plurality of photosensors ...; a plurality of transistors, each transistor connected to and transferring charge from a respective photosensor; a plurality of storage nodes, each node coupled to a respective shutter transistor and storing charge transferred by a respective one of said plurality of photosensors; a plurality of transfer gates, each transfer gate connected to and transferring charge from a respective storage node; a floating diffusion node connected to said plurality of transfer gates for receiving charge from said transfer gates; and a readout circuit connected to said floating diffusion node to output charge accumulated at the floating diffusion node." Applicants' FIG. 3 (reproduced below, next page) discloses an exemplary embodiment of the present invention.

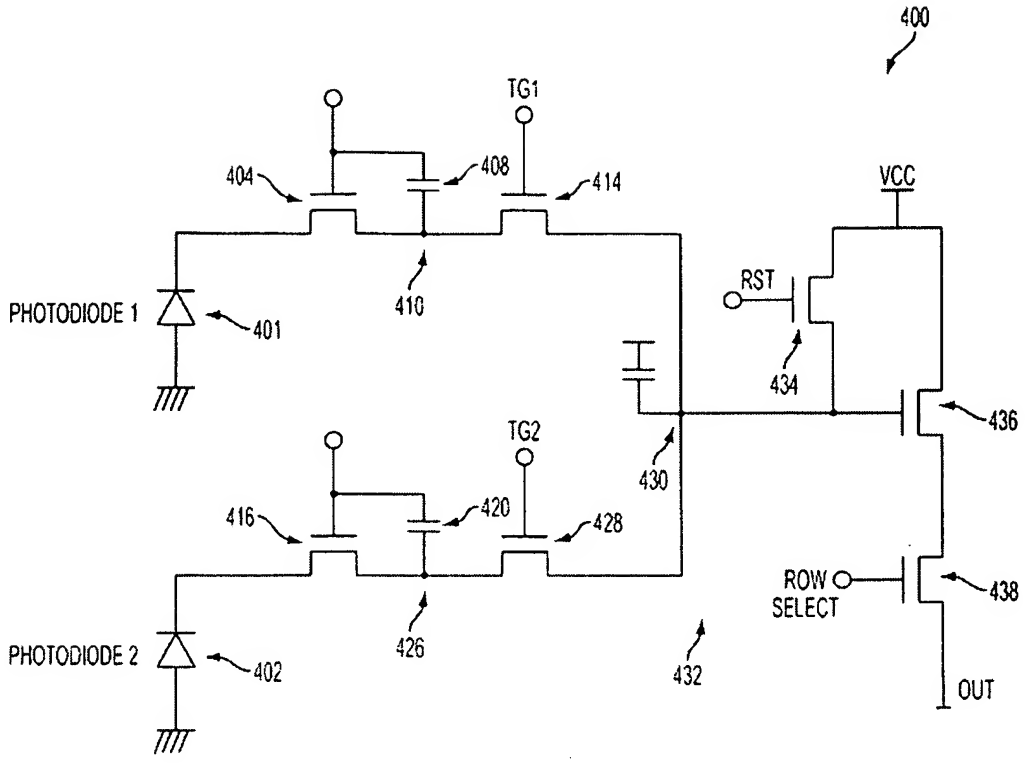
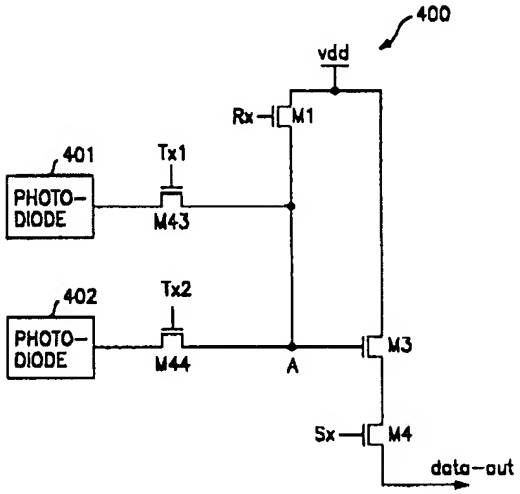


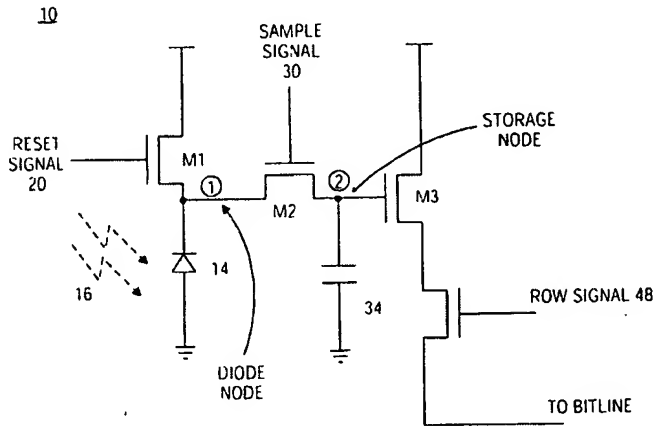
FIG. 3

The Office Action states that Kim discloses a pixel circuit for use in an imaging device comprising "a plurality of photosensors for generating charge during an integration period (c. 4, l. 65 – c. 5, l. 15; Figure 4, "401", "402"); a plurality of transfer gates, each transfer gate connected to and transferring charge from a respective storage node (c. 4, l. 65- c. 5, l. 15; Figure 4, "M43", "M44"); a floating diffusion node connected to said plurality of transfer gates for receiving charge from said transfer gates (c. 4, l. 65- c. 5, l. 15; Figure 4, "node A" which is the source/drain diffusion of "M1"); and a readout circuit connected to said floating diffusion node to output charge accumulated at the floating diffusion node (c. 4, l. 65- c. 5, l. 15; Figure 4, "M1", "M4")." (Office Action, page 5-6). The Office Action admits that Kim fails to teach "a plurality of shutter transistors, each shutter transistor connected to and transferring charge from a respective photosensor and a plurality of storage nodes, each node coupled to a respective shutter transistor and storing charge transferred by a respective one of said plurality of photosensors." (Office Action, page 6). The Office Action relies upon Beiley to teach "a shutter transistor (Figure 1, "pass

transistor M2") connected to and transferring charge from a photosensor to a storage node (Figure 1, "node 2"), the node coupled to a respective shutter transistor and storing charge transferred by the photosensor (Figure 1, charge is stored at "node 2" via "capacitor 34")." (Office Action, page 6). The Office Action concludes that it would have been obvious to combine the "shutter transistors and storage for each photosensor as disclosed by Beiley in the pixel circuit having plural photosensors disclosed by Kim." (Office Action, page 6). Applicants respectfully disagree that Kim and Beiley are combinable in the manner asserted by the Office Action, as discussed in greater detail below.



Kim FIG. 4



Beiley FIG. 1

Kim teaches that it is "an object of the present invention to provide a CMOS image sensor that may reduce its chip area by decreasing the number of transistor[s] for a pixel array." (Kim, Col. 2, Lines 64-66). In other words, Kim teaches that it is desirable to have as few elements as possible in the image sensor. In accordance with this goal, Kim discloses an image sensor exclusively containing two photodiodes 401, 402; two transfer transistors M43, M44; a single sensing node A; a reset transistor M1; a transfer transistor M3; and a select transistor M4. (Kim, FIG. 4; Col. 4, Line 60 – Col. 5, Line 24). Beiley, on the other hand, discloses an image sensor containing a shutter M2 and storage node (node 2) for each photosensor. (Beiley, FIG. 1). As Kim teaches that the image sensor should have as few elements as possible, Kim directly teaches against the addition to the image sensor of the shutter and storage node disclosed in Beiley.

Additionally, while Beiley discloses an image sensor containing elements not disclosed in Kim's image sensor, the image sensor disclosed by Beiley lacks the transfer transistors M44, M43 and the shared storage node A among pixels of Kim. (Beiley FIG. 2; Kim FIG. 4). Kim teaches that a single storage node A is shared amongst pixels and "outputs the photoelectric charges to a control signal Rx." (Kim, Col. 5, Lines 16-19). In contrast to Kim, Beiley discloses no transfer transistor and necessarily teaches away from a shared storage node amongst a plurality of pixels as the result of such a shared storage node in the absence of a transfer transistor would be a blending of all signals from the photosensors sharing a common node. (Beiley, FIG. 1, Col. 3, Lines 19-35). Thus, it would not be obvious to one of ordinary skill in the art to combine the image sensor of Kim, its transfer transistors and shared storage node, with the image sensor disclosed by Beiley.

Accordingly, claim 19 is not rendered obvious by the combination of Kim and Beiley. Claims 20 and 23-26 depend from claim 19 and are allowable for at least the reasons mentioned above with respect to claim 19.

Independent claims 3, 27 and 42 contain limitations similar to those of claim 19 and are allowable over Kim in view of Beiley for at least the reasons mentioned above with respect to claim 19 and on their own merits as discussed within the preceding paragraph. Claim 6 depends from claim 3, claims 28-29 depend from claim 27 and claims 43, 45, 46 and 48 depend from claim 42 and are allowable for at least the reasons mentioned above with respect to claims 3, 27 and 42, respectively. Applicants respectfully request that the rejection of claims 3, 6, 19, 20, 23-29, 42, 43, 45, 46 and 48 be withdrawn and the claims allowed.

Claims 4 and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim in view of Beiley and further in view of U.S. Patent No. 6,697,114 ("Merrill"). This rejection is respectfully traversed and reconsideration is respectfully requested.

The Office Action characterizes claim 4 as a "method claim corresponding to apparatus claim 19" and rejects claim 4 on the same basis as claim 21 as discussed below. (Office Action, page 10). Claim 4 depends from claim 3 and is allowable over Kim in view of Beiley for at least

the reasons mentioned above with respect to claim 3 as well as for the reasons discussed below with respect to claim 21.

Claim 21 depends from claim 19 and is allowable over Kim in view of Beiley for at least the reasons mentioned above with respect to claim 19. Claim 21 further limits claim 19 and recites that "said storage nodes comprise capacitors formed above a substrate in which the floating diffusion node is formed." The Office Action relies on Merrill to disclose that the "storage capacitors are formed above the substrate." (Office Action, page 10).

Applicants respectfully submit that Merrill does not remedy the deficiencies of Kim in view of Beiley. That is, Merrill also fails to disclose, teach or suggest a pixel circuit for use in an imaging device that includes "a plurality of shutter transistors, each shutter transistor connected to and transferring charge from a respective photosensor; a plurality of storage nodes, each node coupled to a respective shutter transistor and storing charge transferred by a respective one of said plurality of photosensors" as is recited in claim 19.

Accordingly, claims 4 and 21 are allowable over Kim in view of Beiley and further in view of Merrill. Applicants respectfully request that the rejection of claims 4 and 21 be withdrawn and the claims allowed.

Applicants gratefully acknowledge the Examiner's statement that claims 22 and 47 would be allowable if rewritten in independent form. However, in view of the arguments advanced above, Applicants believe the claims to be allowable in their current dependent form. Applicants respectfully request that the objection be withdrawn and the claims reconsidered.

In view of the above, Applicants believe the pending application is in condition for allowance.

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Respectfully submitted,

By

Thomas J. D'Amico
Registration No.: 28,371
DICKSTEIN SHAPIRO LLP
1825 Eye Street, NW
Washington, DC 20006-5403
(202) 420-2200
Attorney for Applicants